Bang Kad: A Reflection of Local Wisdom to find Wild Honey and Ecological Use of Resources in Melaleuca Forest in the Songkhla Lake Basin

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Abstract

The purposes of this study were to explore traditional knowledge in ecological use of resources in the case of honey hunting in a Melaleuca forest. The study was conducted in Khuan So Sub-District, Khuan Niang District, Songkhla Province, a community in the lower Songkhla Lake Basin. The data were collected through interviews with 20 honey hunters and other related people including directors of the Community Enterprise groups, local elderly and customers both retailers and consumers. A survey and analysis of forest conditions, focus group discussions, participatory observations, and related documents and research reports were used in the data analysis procedure.

The results of the study revealed that most honey from the Melaleuca forest was from large-sized honeybees, *Apis dorsata frabicius*, that cannot be raised. Nevertheless, Khuan So community has interesting traditional knowledge in honey hunting, that is, building hives similar and harmonious with nature called "Bang Kad". These hives have been passed

down for over a century, accumulated from the age of honey sellers who are now 102 years, eventhough the community of Khuan So, was established as a formal settlement only seven decades ago, in 1940. The community has an ecological way of collecting honey taking into account sustainable use of honey bees that reflects on coexistence of humans and forests. As time has changed from the past to the present, the community had to adapt for survival and security of life that is dependent on fertility of resources. Thus, the knowledge of honey hunting has partially changed with some similarities and differences from the past, and there has been a change in materials used in making hives in which concrete is used instead of wood, and the word "Bang Kad" may be changed as "Home stay of bee" or "Resort of bee", also to make it easier to understand, a "Bang Kad" is a home where bees stay.

Despite the changes, the traditional knowledge of wild honey hunting and bee hunting is important in the ecology, economy, and social systems of the community. It is local wisdom that reflects the complex interrelationship between knowledge, belief, and practice covering the knowledge level and management system and taking the next generations into account. The conflict mitigation process is based on a closely kinship relationship. The social institutions overseeing resource management, worldview, religion, culture, belief, and ethics that influence enforcement of community rules and regulations reflect the use of power: both community power and supernatural power. As can be seen, traditional knowledge in ecological use of resources of Khuan So community is potentially ready to link and to be integrated with knowledge from the outside for community forest management. Therefore, it is challenging to have integrated cooperation for sustainable community forest management in the Songkhla Lake Basin.

Keywords: Local Wisdom; Ecological Use of Resources; Wild Honey; Melaleuca Forest; Songkhla Lake Basin

Introduction

Human relations with the natural philosophy of Functionalism says that human are one of the elements in a natural ecosystem and they play roles as both producer and consumer in relation to a variety of other elements (Suwanmanee, A., 2012: 28). This relationship is based on dependency on each other, using the resources carefully to ensure the resources are passed on to the younger generations. The set of knowledge gained from experience in the continued practice is known as "Local Wisdom". This covers basic knowledge of resources, information systems of resources and levels of resource management which includes appliances and techniques in practice. This set of knowledge is derived from the observation and understanding of ecological processes from various social and philosophical institutions, including religious and moral beliefs and has been used to supervise the management of resources and preach to the people's awareness about the environment. This local wisdom plays an important role among the various compulsory rules of the community along with the power of the beliefs about the supernatural as well as the relationship between communities and nature (Santasombat, Y., 1999: 48; Santasombat, Y., 2003: 48-56). There are local wisdoms in ecological development in communities around the world, such as Dehesa, the knowledge about forest management in Extramadura region of Spain (Linares, A.M., 2007: 71-79), Muyong and Lapat with the local knowledge relating to the conservation of forests in the Philippines (Camacho, L.D. et al., 2012: 3-8). Local knowledge is one important mechanism to regulate the use of community forests. Parrotta, J.A. et al. (2012: 5-6) suggests that there should be an integration of local knowledge and technical knowledge in the research process to find a new condition or dimension of sustainable forest management on the basis of cooperation between stakeholders.

For Thailand, local wisdom is linked to a wide range of forest management, varying according to the context and conditions of each community. There are different sets of knowledge of different types of resources. For example, use of wood in the community of Yeesarn, Amphawa district of Samut Sakhon Province which has rich mangrove

forests, people agree to cut only wood at a proper size (Tantaweewong, A., 2003: 211). Other various ethnic groups in the highlands of the north such as the Pgazkoeuyau who have ethical use of resources associated with their proverbs that teach their descendants to respect and be grateful to the nature. Another example is the Hmong who are traditional in the treatment of the Dong Seng forest because of the belief that the Holy Spirit is residing in the forest (Santasombat, Y., 2004: 21; Kanjanapan, S., 2011: 330-336). These wisdoms discussed above have something in common as they comprise a wide range integration of knowledge, belief and practice with respect to the use of the forest.

"Bees" which are an important source of "honey", are a vital natural resource to many communities that have the wisdom of their own. Utilization of wild honey reflects the mutual supports between people, wild bees and forests. As well bees have related to the human way of life for more than thousands of years. These animals first taught man to know the sweet taste of natural honey (Crane, E., 1975, cited in Wongsiri, S., 1989: 10). Man, bees and wild forests reflect relationship between man and nature in terms of how human life around the world learn from and rely on nature.

In this same way, the community in south of Songkhla Lake Basin, covering the Melaleuca forest that call "Tung Bang Nok Ohk", located in Khuan So sub-district, Khuan Niang district, Songkhla province, is an important resource in the community that people use for a variety of its resources both directly and indirectly; as food resources, source material in fishery, fence, stables, wood charcoal as well as for learning about the ecosystem that creates psychological aesthetics to the community and visitors. Wild honey is an important resource of Melaleuca forest of Tung Bang Nok Ohk. It is the natural resource that generates revenue for the community. Wild bees can be seen as a natural measure of the ecosystem and a continuous link between the lives of people and forests. The way local people collect honey using traditional knowledge is another interesting resource to study. This knowledge is another set of traditional knowledge that reflects the complex relationship of knowledge, belief and

practice of the community around Songkhla Lake Basin. Therefore, learning and encouragement in transference of such knowledge is critical to the economic and social ecology of community. It also helps to maintain the large green area of the basin and allow it to continue. Therefore this research aims to study the use of local resources for the conservation of wild honey in the Melaleuca forest area.

Study Area

1) Khuan So sub-district is located in the southern part of Songkhla Lake Basin in Khuan Niang district, Songkhla province. There are eleven villages. 70 percent of the villagers are farmers, 15 percent work in small fisheries and 15 percent are traders or other occupations. Most of the farmers are rice farmers (Khuan So Sub-district Administrative Organization, 2012). Melaleuca forest of Tung Bang Nok Ohk is an important resource area; it is the biggest and most wealthy Melaleuca forest in Songkhla province. The forest land was preserved as a national forest in the year 1964 (Figure 1) with a total area of 6,250 rai (24,712.25 acres), representing one-fourth of the total area of the district, covering six villages.

Figure 1: "Tung Bang Nok Ohk" –National Forest, Khuan So Sub-district, Khuan Niang District, Songkhla Province.
Source: Research Center of Geographic Information Science, Prince of Songkla University (2010: 39).

2) This study is a qualitative research, the data were collected through interviews with 20 honey hunters and other related people including directors of the Community Enterprise groups, local elderly and customers both retailers and consumers. Data collection entailed a focus group discussion, a survey and analysis of the forest, and observation and participation in community activities. Participatory observation, both directly and indirectly in learning local knowledge about the tools and harvest of wild honey. A content analysis of documents and related research was used to validate the analysis of the data obtained from the data collection.

Results

The Complementary Relationship of the Villagers, Bee, and Melaleuca Forest

Khuan So community residents have been taking advantage of vast tracts of Melaleuca forest for wild honey for over a century, calculated from the age of honey sellers who are now 102 years old even though the community was only formally settled in 1940, over seven decades ago. There is a migration of wild bees into the Melaleuca forest of Tung Bang Nok Ohk throughout the year, but there will be the largest amount in the beginning of the rainy season in August when the Melaleuca flowers begin to bloom. The bees mostly found in this area are large-sized bees (*Apis dorsata frabicius*), found throughout Thailand and almost every country in Southeast Asia and India. The bees move up north for flowers in the orchard in winter and move back to wild forests when it rains, when there are no flowers in the north (Wongsiri, S. et al., 2000, quoted in Swastham, A., and Wongsiri, S., 2003). The Melaleuca forest of Tung Bang Nok Ohk is therefore a large tract of an important source of nectar for the bees. Honey from the Melaleuca forest has the smell and taste of the flower itself. The honey mainly produced from the Melaleuca forest are from a particular type of tradition knowledge called “Bang Kad”.

The Wisdom to find wild honey as call "Bang Kad"

"Bang Kad" is a form of finding wild honey in the community that reflects the observations and knowledge of the nature of bees and an understanding of the nature of Melaleuca forest, leading to the applications, accumulated experience and transference of knowledge of living a life of reliance on nature from generation to generation. There is no written record but people in the community provide information stating that honey has been found in this way for a very long time.

The nature of "Bang Kad", this term is given to mimic the facade of natural bee nests using wood and wood bark. The wood (A) used to make the main structure of the mimic bee nest comes from the trees that have bark like the Kratin tree (*Acacia auriculiformis Cunn*), the Nontree (*Peltophorum pterocarpum*), the Katang Baiyai (*Litsea grandis*) and the Po (*Ficus religiosa L*). Melaleuca wood is not normally used because it has a soft shell and the bees do not build their nests on it. Another reason the bees do not build their nests on the Melaleuca wood is because of the endophytic fungus grown on the plants as habitat and food source. While fungi produce secondary metabolite, which are able to be beneficial to plants in both plant toxins that prevent the destruction of insects and antibiotics that are effective against bacteria. In fact, Melaleuca tree (*Melaleuca cajuputi*) is the main vegetation covering most area of the forest dense with a small distribution of other types of trees such as lead tree, pine and vines. There are, therefore, not many trees that bees can use as wood façade to bear their hives. The building of "Bang Kad" in the Melaleuca forest add additional habitat for bees and provide more sources of nectar. In preparing the timber for the main structure of "Bang Kad" (A) is laid across the top, supported by two columns made of smaller wood sticks (B, C). Small pieces of Melaleuca wood are embroidered on the length of the lever (D) of the heap and it is covered with leaves to make it look like natural plant (E) (See Figure 2-3). The "Bang Kad" is about 2-3 meters high and put in the open air with adequate sunlight along edges of the forest.

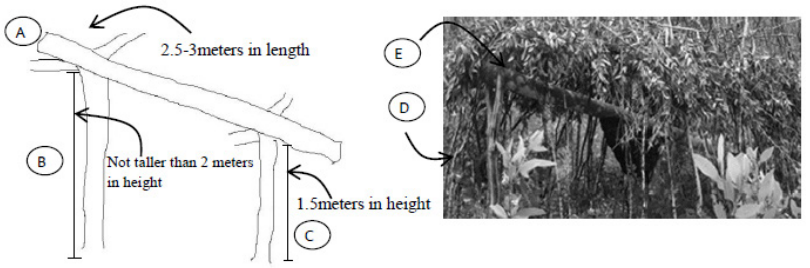

Figure: 2-3 The Structure of the traditional Bee hive (Bang Kad) and bee comb in Bang Kad

A "Bang Kad" is derived from the wisdom of the wise man who learned by observation and trial practice until success was experienced and transferred that knowledge from generation to generation; both the knowledge about the types of plants that bees often nest in and the types of bee nesting. There are many patterns and tips for making a bee nest, such as the right direction of the entrance with the front facing the open space that attracts bees to nest easily. It is also convenient for the bees to get in and out of the nest. The knowledge of these things are a profound practical local wisdom which is consistent with scientific data to discover the truth about the biology of bees looking for their natural nest high in a tree or in the open air, seeing the sun or the sky in order to seek the location of food sources and nesting (Wongsiri, S., 1989: 72-76; Akkaratanakun, P., 1991: 8-9; Wongsiri, S. et al., 1996, quoted in Duangpakdi, D. et al., 2003: 386; Chaojarern, P., 1985: 21).

However, the use of forest resources in making a "Bang Kad" does not mean a bee hive in a "Bang Kad" can be collected from by anyone; only the owner of that "Bang Kad" can. There is a proprietary system of community governance including traditional mechanisms of conflict management, as will be discussed in the next section.

Property Regime and Resolutions of Conflicts

Knowledge of the property regime is important in order to understand the community and its resources and to avoid conflicts

or future changes that are likely to worsen. It is necessary to study the advantages and disadvantages of each type of tenure with the community and find perceptible ways of the property management system at work and the interaction between the system and the realization of ownership of each community (Sattayanurak, A., 2005: 172). However, the property regime is typically governed by ownership, like state property regimes, common property regimes and open access property which has no owner, such as a river or canal (Susuki, P. et al., 2009: 312-314; Smuttacup, S. et al.,1993: 18-21).

However, a "Bang Kad" is a use of forest resources at the individual level, owned by the person who made it and this rule is generally recognized in the community. Stealing from a "Bang Kad" made by someone else would cause a discrepancy, but the kinship relationship among the owners makes works in favor of a positive solution. The process starts by talking amicably between the parties, with the mediation of elders, community leaders, or a mediator and the issues being brought to a joint meeting of the council of the community organizations. Figure 1 shows the proprietary system of honeycombs in infringement, and the resolution of disputes in the community. It can be seen that the relative relationship of the community is an important mechanism that enables a process to resolve disputes in the community.

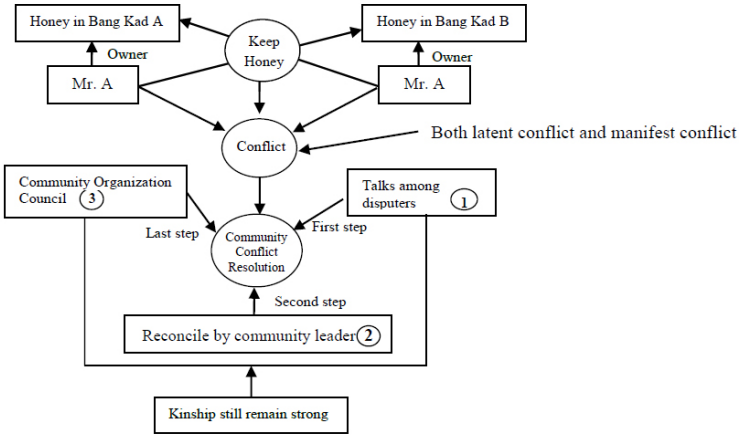

Diagram 1: Property regime of "Bang Kad" –Traditional Bee hive, and Conflict Resolution

Conservative ways in collecting honey

After bees build their nest in Bang Kad, how the villagers harvests honey is the knowledge that reflects ethics for long-term resource utilization.

1) Honey Hunting from Apis dorsata

Honey hunting differs in each location. For the villagers in Khuan So, the honey will be collected after the bees have nested for 21 to 25 days to get the best yield. This knowledge gained by trial and error and passed on to the successors. This practice, however, has been proved to be consistent with the biology of bees because by that period of time most of the bees in the hive are out of the nest, and have left for the honey hunters with much honey and some bee larvae. Most people use a traditional torch called "bear head". It is made from fresh Melaleuca leaves wrapped around the wood twigs and tied with vines called "Bean Ghost" (Figure 4) set on fire to only give off smoke. Then the torch is pointed at the honeycomb (Figure 5), to drive the bees out of the nest. Honey hunters will cut the honey on the head of the hive only at approximate 30 percent and leave the remaining 70 percent for the bees to fly back to the nest again and collect their honey in the same nest (Figure 6).

Figures 4-6: Bee hunters are collecting the vine "Bean Ghost", smoke from "bear head" (torch) and a bee hive in a "Bang Kad"

2) Belief in Smoking Bees to get Honey

Faith is always coupled with confidence and this can be seen in all human Faith (Pongpaiboon, S., 1997). The community of Khuan So believes in the process of smoking bees for honey. They use the "bear head" in collecting honey from the bee hives. After the bee hive has

been smoked and cut, some honey is placed on the "Bear Head" to make offerings to a spirit, that called "Sen Hua Mee", as a mean of showing gratitude to the bear head (Figure 7).

Figure 7: The Rewarding of Honey for the "Bear Head" (torch)

It has been believed since ancient times that the bears help honey hunters in taking the honey yield. "Sen Hua Mee" can be one of the strategies associated with ancient teachings. This case is about cultivating gratitude among the people in the community. If we consider the reasons for the survival of this practice, it can be seen that the honey given as reward or as warship to the "Bear Head" can attract the flying bees in the area to suck it and then they do not harm the honey hunters. While holding a container with honey, bees may come and sting the hunters after they have left the "Bear Head" and they have no defense from the remaining flying bees. This belief and practice is an ingenious strategy of the ancients to protect themselves and their property.

Look Future with Community enterprise group for apis dorsata bees conservation

Honey from the Melaleuca forest has generated positive revenue for the locals for a long time and this has been recognized as a sustainable income by several related organizations. Therefore, a community enterprise for the conservation of wild bees in Khuan So was established in 2012 (Figure 8) focusing on the conservation of forest resources including an awareness of how to handle bees without destroying their embryos, and to enable multiple harvests of honey from the same

"Bang Kad". As a result of this enterprise, group members agreed on these strategies to help them have extra income from honey for the long term. Moreover, there are exchanges of knowledge and raised awareness on the issue of sustainable Melaleuca forest management and prevention of forest fires which destroy most of the Melaleuca flowers, the source of honey that the bees need. Wild fire also kills bees due to the fact that bees will not fly out of the hive when it is on fire; they remain to guard their nest. Moreover, the "Bang Kad" of the locals will be destroyed, too.

Figure 8: The Opening Ceremony of Community Enterprise Group for Apis dorsata Bee Conservation in Khuan So, Khuan Niang District, Songkhla Province (5 July 2013).

In addition, the group also experiments using concrete beams instead of traditional wood beams to study its potential use in making a bee hive. If this works well, the bee conservation group can reduce the use of wood logs to keep the green areas in the community. This can be one of the means of preserving the environment, the community and the Songkhla Lake Basin.

Past, Present and Future of Knowledge of Wild Honey Collection in the Community

The knowledge of how to find wild honey of the residents in the Khuan So community of past, present and potential future trends are summarized in Table 1.

Table 1: The past, present and potential future knowledge of the community regarding wild honey

Issues	**Past**	**Present**	**Look Future**
Material Bee hive (Bang Kad) patterns and site selection Smoking the bees for honey	-The wooden beams of a honeycomb. -Choose an area of open space where the Melaleuca tree (*Melaleuca cajuputi*) is not higher than 2-3 meters and along forest edges.	-The wooden beams of a honeycomb. - Choose an area of open space where the Melaleuca tree is not higher than 2-3 meters and along forest edges.	-The wooden and concrete beams of a honeycomb. -Choose an area of open space where the Melaleuca tree (*Melaleuca cajuputi*) is not higher than 2-3 meters and along forest edges.
	-The smoke from a tool called a "Bear Head"	-The smoke from a tool called a "Bear Head" .	-The smoke from a tool called "Bear Head"
	-Cut off the heads of both the honey and the hive of the nest. -At least two people working together using the smoke from a tool called a "Bear Head".	-Cut only the head of the honey, some cutting andnesting. However, the integration tends to improve the conservation of nesting. -At least two people working together using the smoke from a tool called " a "Bear Head".	-Cut only the head of the honey and does not cut the nest from agreements on exchanges and mutual learning of the group. -At least two people working together using the smoke of a tool called a "Bear Head".
Faith	-Offering honey to the "Bear Head"	-Offering honey to the "Bear Head"	-Offering honey to the "Bear Head"

Table 1: Continued

Issues	Past	Present	Look Future
Knowledge transfer	-Teaching and practice how to make it.	-Teaching and practice how to make it. -Integration of shared knowledge and willingness to help each other.	-Teaching and practice to make it. -Integration of shared knowledge and willingness to help each other and gain support from various organizations.

It can be seen that during an approximate period of seven decades, the set of knowledge of getting honey of the Khuan So community is reproduced by maintaining the same format regarding the materials used and the style, the way to smoke the bees to get the honey, and the faith and knowledge. However, the community enterprise group for bee conservation fosters the exchange of knowledge and raises the awareness of conserving wild bees for its members. The group is experimenting using concrete instead of wooden pillars for durability and to reduce the use of natural wood, another approach to preserve the community forest. Though in one sense the concrete may be alien in the wild and not in harmony with the natural environment like the traditional wood, and it may affect the ecosystem when it is left as permanent waste. There must be a study on the impact to surrounding areas when they start using concrete. Another important issue to be considered is that the term “Bang Kad” is now used by the group as a “virtual bee host” or a “bee resort” bearing a clearer image, but with the possibility that the ancient term “Bang Kad” may be lost and not be known by the younger generation. These issues should be considered in the process of Melaleuca forest management.

Summary and Discussion

This study describes the local wisdom in collecting wild honey in Khuan So community, which corresponds to the description of local knowledge by Berkes (1999, cited in Kanjanapan, S., 2011: 330-336) stating that local knowledge is diverse and yet shares common characteristics of complex interaction of knowledge, belief and practice. These complex interactions reflect many types of the knowledge in operating procedures for honey collection ranging from knowledge of types of trees and species of bees and the observation of bee behaviors, and the use of this set of knowledge in building nests for the bees. The operating procedures for honey collection are associated with the conservative management ideas that recognize the importance of resources and their ethical use necessary for survival and livelihood security considerations. The regime under the doctrine of honey collecting procedures teaches local people to be grateful and provides strategies that prevent a dangerous situation by employing supernatural power/belief to enforce the rules of the community through the reproduction and transmission of these rules from generation to generation. Bee collectors learn to support one another because the operating procedure for honey collection if done alone, is time consuming and dangerous, while cooperation and division of labor make great work.

However, the belief in the potential of operating procedures for honey collection varies from area to area. For Banpi community, in Chiengkan district, Phayao Province the operating procedures for honey collection are believed to be done by people who have black magic and the trees bearing bees are resided by the guardian spirits so the honey collectors worship the trees with chicken and alcoholic drinks and wrap the tree with monk cloth before carrying out the honey collecting procedure (Phayao Rad-Phayao Province, 2009). Honey collectors in Suan Khan sub-district, Chang Klang district, Nakhon Si Thammarat Province, hold a significant tradition of the community by collecting honey in the evening and presenting the offerings and pleading before pedaling up the tree and pledging again showing good will before collecting the honey.

Then they sway the torch around the bee hive to drive them away, not being killed in fire so that they can return to the nest again, and this is safe for the bee keepers as well. They are taught not to throw away the shovel for cutting the bee hive from the tree for fear that the mystery spirits will not allow it to be used again (Community Cultural Center, Ministry of Culture, 2011). The use of smoke and the practice of cutting out only the top part (not the whole) of the honey hive is a traditional practice in many communities in Thailand. These practices were observed during the past ten years by locals in Ban Hin Lad, Ban Pong sub-district, Wiang Pao district in Chiang Rai province and results showed that the bee population in the community forest rises (Siri, A., 2010). There is a tendency for an increase of the bee population in Khoun So community because the conservative honey collecting procedure has already existed. What should be guarded against are illegal logging and wild fire in Melaleuca forest for these will destroy the source of the nectar of bees.

In terms of bee conservation groups, the groups should be formed as a social institution that can encourage and monitor the community resource management and the cooperation among the community members. The Panpi bee conservation group can be a good example in pooling and managing collected honey by the Community Forest Fund and setting aside some income for the member welfare. The Community Enterprise Group of Khuan So community is a good start, challenging the community to join forces to establish cooperation in community resource management. Moreover, the strong kinship community is another mechanism to help resolve disputes in the community. This is consistent with the findings of Chuapram, S. et al. (2012) who studied the variation of the local communities living around Songkhla Lake Basin. Results of the study showed that the kinship relationship of the community has existed more than a century ago (before the year 1927 to 2010), and the lineage relationship of these communities are still very strong.

For the development of the interaction of knowledge, belief and practice, as time goes on, the method and procedure used in the local community to collect honey of Khuan So community have been

modified at some points in knowledge and practice. They are now experimenting in using concrete structures for the "Bang Kad" instead of wood structure and in an integration of enterprise management systems, while their belief is still intact. This development is similar to the local knowledge and practice in beekeeping in South Korea, Ukraine and Uganda. The forms of hives vary according to the time frame of the original hive. Originally, bees were bred in hollow logs of different kinds according to the ecology of the area. Later these have been replaced by a wooden box and a variety of other hive formats (Kizito, G., 2010; Park, M.S. and Yeo-Chang, Y., 2012, Grigoras, O., 2012). In India, they make bee hives in hollow bamboo trunks dissected into two halves for the bee to hatch. Bees build nests completely within two hours, and then the nests are hung on the attic of the cottages (Kumar, M.S., Singh, A J A R., and Alagumuthu, G., 2012), while French honey collectors make a honeycomb inside a stone structure (Walker and Crane, 2004). Bee hives in a form of a Bang Kad of Khuan So are a unique method for collecting honey and its development in replacing the wood structure of "Bang Kad" with a concrete structure is a still a trend for the future.

The community management model and the use of existing resources in Khuan So is carefully done with regard for the next generation, coupled with the views of conservation and utilization of resources. It also reflects the consistency of the recognition of the changes that affect careers in collection honey with lower income and the negative affects to the environment as a result of observing and learning regarding problems caused by forest fire and climate change. The recognition of these problems is consistent with the results of the comparative analysis of the relevant scientific data. This seems to prove that local knowledge can be compatible with scientific learning with an action research in a laboratory through natural data linked together harmoniously in economic, social and environmental dimensions. This set of tradition knowledge in collecting honey also carries a variety of ingenious strategies to strengthen the core of the community, based on self-management of the local community resources. In conclusion, the set of knowledge

in community management of wild honey of Khuan So community can be a good example in the use of resources and the promotion and encouragement of local knowledge and it might be used as a model for natural resources and environmental management policies in other communities.

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